The Mining Journal

LONDON, JULY 15, 1960

Vol. 255. No. 6517

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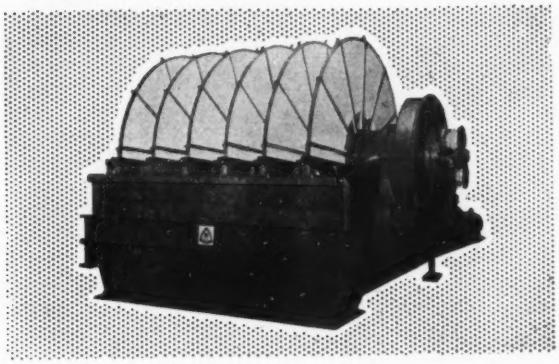

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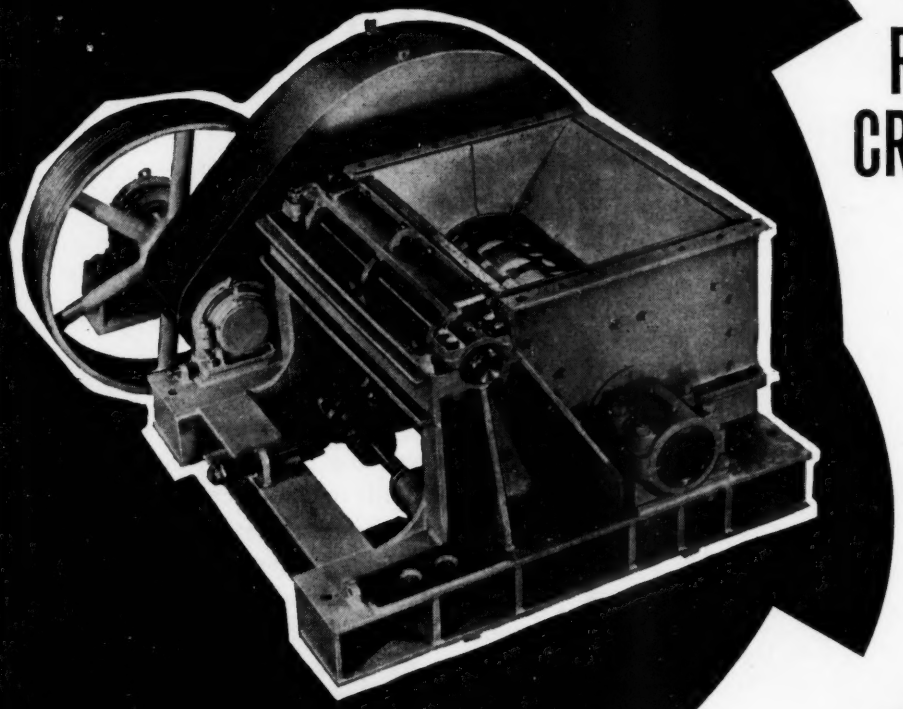

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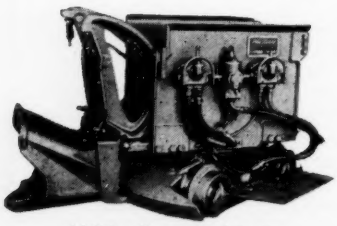
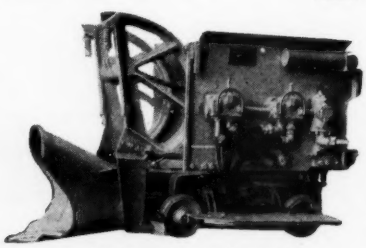
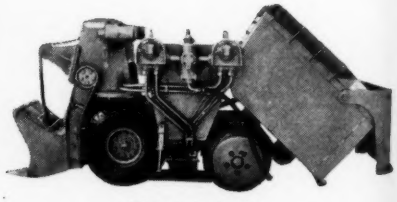


LM56 rail-mounted loader



LM250 rail-mounted loader



T2G Auto-loader

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In this issue . . .

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Katanga Breaks Away

M. MOISE TSHOMBE, African Premier of Katanga, has proclaimed this wealthy mining province, source of three-fifths of the Congo's wealth, an independent State. He has announced secession from the Congo Republic and has appointed his own army and police chiefs.

This dramatic development was by no means unexpected, for it has long been apparent that the separatist movement in the Katanga represented the most formidable threat to the emergence of the Congo as a single entity. M. Tshombe's move could scarcely have been better timed, for the Congolese Government with a mutinous and officerless army on its hands and anarchy prevailing at many points of the huge territory for which it has become responsible, is in no position to hold the Katanga by force.

As to the outcome of this confused situation, all that can be said with any degree of assurance is that without military and technical assistance from some outside source it seems almost impossible for Katanga to survive as an independent state. M. Tshombe appealed for Belgian co-operation, but there are indications that, for the time being at least, the Belgians will continue to treat the Congo as a single unit, since the loss of Katanga would deprive the republic of its economic heart. Union with the Central African Federation might appear superficially to offer a logical and attractive solution. The Federation, however, is obviously not prepared to take any action which would precipitate an extremely dangerous international situation, apart from the adverse effects on its own internal political difficulties.

There remains the possibility that some form of protection might be forthcoming from the United Nations, whose Secretary-General has called together the heads of the nine African member States to discuss the crisis in response to the Congolese Government's appeal for intervention. The news that the United Nations is to send technical advisers, together with the probability of police or military assistance through the U.N. to restore law and order, hold out some hope that a peaceful and lasting solution to the problems of Katanga and of the Congo itself might not be indefinitely delayed.

It remains to be seen how soon the mining industry will recover from the wave of chaos and lawlessness which led to the suspension of operations. According to a statement from the company's Brussels office, production was suspended because the European staff of the electrical generating plant were evacuating their families to Rhodesia. In Northern Rhodesia, however, officials of Union Minière said that the decision to close the copper mines was taken after ten or more mining officials had been murdered. Refugees from Shinkolobwe are also in Northern Rhodesia. The uranium mines are now almost deserted and valuable machinery has been left unguarded.

Nevertheless, the immediate outlook appears to have become rather more encouraging. An announcement by Union Minière

states that the treatment plant at Lubumbashi has been re-started and copper is being shipped as usual. A Belgian Command unit is reported to have occupied Jadotville, where the leads and the main transformer station are apparently undamaged, and another unit was on its way to Kolewzi. Power plants at Jadotville and other centres are said to be in operation.

Some key mine officials who have already returned to Katanga stated before leaving Northern Rhodesia that they hoped to have the mines operating again on Wednesday (July 13). It would appear, however, that so few employees have obeyed their company's appeal to return to work on the copper mines that, according to present indications, most mines seem likely to remain closed some time. Since the employees heard that at least two workers who drove back of their own accord during the weekend were murdered on the road, the poor response to the company's appeal is hardly surprising.

A report received as we go to press states that the Lubumbashi copper plant and the Kipushi mine — both near Elisabethville — are again operating and the company plans to put other plants and mines into operation gradually as and when local managers and technicians return to their jobs.

Fortunately the risk of permanent damage to mining plants during the present riots appears to be comparatively small, more especially as the mines are shallow opencast operations and hence much less susceptible to sabotage or the effects of prolonged shut-downs than deep lode mines. M. Tshombe has appointed a Belgian officer, Major Weber, as co-ordinating officer in charge of all armed forces and police in Katanga. Major Weber is backed by some 4,000 Belgian troops in Katanga, and it is believed that between 2,000 and 3,000 men would be sufficient to protect the whole of the mines. As soon as circumstances permit it should be possible for Union Minière to resume production on the old scale with very little delay. If necessary, products could be sent through Rhodesia and Angola.

So far as the world copper situation is concerned, a prolonged interruption of the Congo supply, should it materialize, must be expected to result in a temporary shortage which could be quite severe. This possibility was reflected in the rise of £7 in the L.M.E. price which followed the news that Union Minière had suspended mine production. In the long-term, however, consumers should not be unduly affected. According to recent estimates, copper production during the next twelve months is likely to exceed demand by about 200,000 tons. The Congo's total production is in the region of 250,000 tons a year. Even if the whole of this tonnage were lost to the market, the deficit could soon be made up from mines outside the Congo, where considerable excess capacity exists.

The troubles in the Congo would appear, however, to have effectively deferred, at any rate for the time being, the need for cutbacks in output which many of the principal producers were prepared to introduce during the next few months and which were generally expected to be in the neighbourhood of 15 per cent.

With an output last year of 10,300 l.tons and an export quota of 8,813 l.tons, the Congo is the fourth largest producing member of the International Tin Agreement. The disappearance of Congo tin from the market would present no immediate threat to supplies, however, because the delay between mine and smelter is such that a consumer could buy forward and get delivery of three-months tin ex-Malaya before metal currently being mined in the Katanga would normally come to hand. While a prolonged interruption of tin production in the Congo would obviously have a serious impact on world supplies, there is thus no reason for anxiety so far as the short-term position is concerned.

MORE THOUGHTS ON THE TIN AGREEMENT

Incredible though it may seem, we were still unable to procure a copy of the draft Tin Agreement last week or even a detailed summary. Moreover, it would appear from our attempts to elucidate certain obscurities that everyone else in London was in much the same boat as ourselves. Due to this lamentable failure in the I.T.C.'s press relations, some of our observations last week call for further comment.

As previously indicated, the second Agreement has been so worded as to ensure that, in a quota period when there is less than 10,000 tons of metal actually or prospectively in the buffer stock, control shall cease. To guard, however, against the consequences of substantial minehead stocks being thrown on the market during a sudden but temporary shortage, the Council is empowered to reimpose control if the buffer stock is above 5,000 tons, provided that there has been no control in the previous quota period. The figure of 10,000 tons can at any time be revised downwards by a two-thirds majority of producer and consumer votes.

Commenting on what we termed " this rather cumbersome machinery ", we suggested that it would make for simpler and smoother operation if the machinery of control, once imposed, were to be kept in continuous being with quotas raised, if necessary, to 150 per cent or more. Having been able to study a copy of the Draft Agreement, we now feel on further consideration that, while from an organizational standpoint our suggested procedure would unquestionably be simpler and smoother, it is hardly likely to be adopted. In the first place, one could well visualize objections on the part of some producer countries to quotas of over 100 per cent, on the ground that when the quota exceeded 100 per cent, the existing percentages—which under the rules set out in Annex C can only be changed when four consecutive quarters have not been declared to be control periods — could no longer be regarded as an accurate reflection of the agreed relationship between the individual producer members.

Another objection is that a considerable body of consumers have always taken the view in these negotiations that to have quotas in operation when there was no shortage would be unreasonable. While a quota of over 100 per cent would make no difference in practice, they would doubtless feel that psychologically it would have considerable significance.

Study on the draft has also clarified what we described as one of the more incomprehensible provisions of the Agreement, namely, that on the date of commencement the buffer stock manager should be required to hold precisely 12,500 tons in metal and 7,500 tons in cash equivalent. This statement was an accurate reflection of the position as set out in paragraph 2 (a) of article 8. At the time of writing, however, we were not aware that the following paragraph authorizes the Council at its first meeting to decide what proportion of the contribution is to be in tin metal and how much in cash. It is, of course, impossible to foretell the state of the buffer stock when the original Agreement expires, and the aim has been to ensure continuity of operation by giving the Council sufficient flexibility to make the most suitable arrangements according to the market situation at the time.

The Agreement provides that, unless otherwise stipulated, issues will be decided by a simple majority. Since the paragraph in question gives no specific guidance on this point, it would appear that a decision to alter the proportions of cash and metal in the buffer pool at the commencement of the Agreement would be taken by a simple majority.

THE U.S. BUREAU OF MINES FIFTY YEARS AGO

The Bureau of Mines, a leader in scientific development and conservation of United States' mineral resources since 1910, was 50 years old on July 1. This internationally famous organization was created at a time when coal mine disasters were claiming the lives of many workers. The Bureau's safety research and training and its co-operative efforts with management, labour, and other Federal and State agencies have been major factors leading to improved conditions in all segments of the mineral industries.

In the ten years before the Bureau began its work in a single research laboratory on the old Arsenal grounds in Pittsburgh, coal miners died at the rate of 364 a year in major disasters. Since then, the fight carried on by the Bureau, and other organizations has reduced that yearly average disaster toll to 32.

By controlling fires that sometimes break out in inactive coal deposits, the Bureau has saved for future generations millions of tons of valuable fuel reserves at a cost of less than a penny a ton. Valuable reserves of anthracite also have been saved through the Bureau's participation in mine drainage projects in the hard-coal regions of Pennsylvania. Commerce and industry are aided by Bureau fact-finding programmes that supply statistical information and economic analyses on domestic and foreign minerals. Friendly foreign nations also benefit from technical advice and assistance provided by Bureau experts through the Economic Co-operation Administration.

In half a century the Bureau has published nearly 8,000 reports describing its findings in research and development work on minerals, mineral fuels, and industrial health and safety. An equal number of articles by Bureau researchers has appeared in the scientific, trade, and technical Press of the United States and many foreign countries. Comprehensive 50-year lists of these reports and journal articles will be issued soon to mark the Bureau's golden anniversary. Bureau scientists have pioneered new metals like titanium and hafnium. They also engineered the process now employed by industry to make zirconium metal.

The Bureau has added substantially to domestic supplies of mineral raw materials. Increased production of copper resulted from its investigations at San Manuel, and White Pine, and many additional barrels of crude petroleum have been produced through its promotion of secondary oil recovery techniques. Bureau studies of blasting, roof bolting, rock dusting and other mining methods and practices have not only improved safety but also have increased efficiency in mines.

HUNGARIAN METAL DEVELOPMENTS

Production of gallium has been started at the Hungarian state-owned alumina plant at Ajka, while studies are being carried out to develop laboratory-scale processes for the production of such metals as vanadium and titanium on a commercial scale. Hungary imports magnesium, but a magnesium refinery is at present under construction which will cover total national demand with its output. Indigenous raw materials will be used to feed the plant. First steps are being undertaken to exploit the considerable reserves of uranium ore found some years ago in the Mecsek mountains.

Experiments in the concentration of iron carbonate ore containing 18 to 19 per cent manganese, to make it suitable for the production of ferro-manganese, promise to be successful. Ferro-manganese and manganese alloys are already produced from 20 per cent manganese oxidic ores, whose content rises to 40-43 per cent with concentration. Hungarian manganese ore, mined in the Urkut and Epleny districts to the south of the country, is produced in quantities sufficient to cover home demand and provide exports for Western Europe. In the first nine months of last year some 115,000 tonnes of ore were mined, as against 182,000 tonnes in the whole of the previous year and 162,000 tonnes in 1957.

Quantities of zinc and lead concentrates are obtained from lead-zinc ore reserves at Gyongyosoroszi.

WARREN SPRING'S FIRST REPORT

The Warren Spring laboratory of the Department of Scientific and Industrial Research at Stevenage, Herts, was officially opened by Viscount Hailsham on June 29 last year. Built and equipped at a cost of approximately £630,000, its facilities include laboratories for mineral processing research and development, where both basic research and sponsored work are undertaken.

The Mineral Processing Division at Warren Spring—its objectives and the facilities at its disposal—were discussed in our issue of November 13, 1959, pp. 476 and 477. The implementation of the research programme is proceeding as rapidly as possible, states the director, Mr. S. H. Clarke, in his annual report for 1959, in which the work so far undertaken is briefly described.

The main subjects currently under investigation are: (a) grinding in the presence of additives such as surface-active agents; (b) the composition of the surface of minerals and the kinetics of bubble attachment to mineral surfaces; and (c) the behaviour of mineral particles in a high tension field and the modifications of this behaviour by various surface treatments.

Experiments have been made with the "shaken helicoid", developed by Dr. C. R. Burch, F.R.S., at Bristol University, in the treatment of slime material.

After a literature survey of the work already carried out on the behaviour of mineral particles in a high tension field, it was decided to study the surface conductivity and charge of particles and to examine the effects of various additives on these properties. The results are being correlated with the behaviour of treated particles in a commercial high tension separator.

Electrometric titration is being used in studying the surface chemistry of flotation. Satisfactory correlation between all the phenomena so far studied can be achieved only by removing some of the uncertainties connected with the use of naturally occurring mineral specimens. For this reason, an apparatus has been constructed for the growing of single orientated crystals by the Bridgman technique and it is intended to repeat most of the earlier work using these crystals.

Studies of the kinetics of bubble attachment to mineral surfaces were commenced earlier in the year. It was found that, apart from the well known uncertainties involved in the measurements and the interpretation of the results, the actual flotation behaviour of clean artificial sulphide films did not correspond with that of the natural minerals. It is hoped that the cause of the discrepancies may be made clear as a result of the electrochemical investigations.

Most of the work of the hydrometallurgy section is related to extraction processes for specific ores and has been undertaken for sponsors. The use of naphthenic acids in kerosine has been studied as a means of separating certain of the base metals when present as ions in solution (provision patent No. 22263/59). Systems including copper, nickel, cobalt, zinc and iron have been examined and a very satisfactory separation of copper from either nickel or cobalt has been achieved.

During the year contacts with the mining industry have indicated that automation may become important in mineral processing plants.

THE ST. LAWRENCE SEAWAY AND THE CANADIAN MINERAL INDUSTRY

THE St. Lawrence Seaway, a deep water canal system between Montreal and Lake Ontario, was opened for navigation on April 25, 1959. Formerly small boats known as canalers and a few deep-sea carriers were the only ships able to sail past Montreal into Lake Ontario. With the opening of the Seaway, large Great Lakes bulk carriers and a much larger percentage of the world's shipping fleet are now able to sail directly from the sea to the heart of industrial North America.

Between 1954 and 1959 over $1,000,000,000 was spent to develop the Seaway and associated power projects. The $475,000,000 Seaway was financed by two federal agencies, the St. Lawrence Seaway Development Corporation of the United States and the St. Lawrence Seaway Authority of Canada. The St. Lawrence Seaway Act, passed in both countries, states that the $475,000,000 for the Seaway must be recovered over a period of 50 years through tolls.

The St. Lawrence Seaway is the subject of a paper by R. B. Elver, in which an attempt is made to evaluate the effect of this great inland water route on the Canadian mineral industry. Presented at the A.I.M.E. annual meeting in New York, February 1960, the study has been issued by the Department of Mines and Technical Surveys, Ottawa, Mineral Resources Division, as Mineral Information Bulletin MR 40 (price 25 c.). Illustration shows a large bulk carrier passing Cardinal, Ontario. Photo is by courtesy of The National Film Board of Canada

New Industries

The success of the power phase of the project was assured from the start because of a large increasing demand and relatively low total cost of production. Besides relatively cheap power, there are several other favourable factors, such as abundant water supply, Seaway and rail transportation, and favourable location relative to many market areas.

For these various reasons, Reynolds Metal Co. recently completed an $88,000,000 alumina reduction plant at Massena, New York, and Chromium Mining and Smelting Corporation Ltd. closed its Saulte Ste. Marie, Ontario, ferro-alloy plant in favour of its Beauharnois, Quebec, plant. Similarly, further industrial expansion can be expected, especially for such mineral processing plants as relate to the aluminium, ferro-alloy and artificial abrasive industries.

For companies wishing to locate in Canada, however, the St. Lawrence River Valley area is equally as attractive. Although transportation costs to Great Lakes and inland markets would be slightly higher, transportation costs for marketable products to the east coast and overseas markets would be lower. In addition, more favourable hydroelectric power costs are available in several locations. At present there are several aluminium, ferro-alloy and electric steel producing plants in the St. Lawrence River Valley and additional expansion is expected.

To evaluate the Seaway phase of the St. Lawrence project after only one operational season is to some extent premature for several reasons. It was to be expected that some initial operating difficulties would be experienced. Many boats entered the Great Lakes for the first time in 1959 and, owing to lack of familiarity with procedure, several delays and minor collisions occurred. The steel strike in the United States had a significant effect on shipping, as also had the strong economic recovery from the general recession seen in the first half of the year. When examining specific mineral commodities, however, some indication of future trends can be deduced in varying degrees from the past year's operations. Iron ore shipments during the present year are likely to be adversely affected by the downturn in U.S. steel operations.

Coal, Coke and Oil

Between 1953 and 1958, shipments of coal through the St. Lawrence canals averaged about 1,600,000 tons annually. Traditionally, about 99 per cent of this total consisted of U.S. bituminous coal from Lake Erie ports bound for the Quebec markets in canalers, which can carry about 2,000 to 8,000 tons of bulk cargo. Before 1954, these boats usually returned to Lake Erie empty, but in 1954 they began returning with Quebec-Labrador iron ore transhipped at Contrecoeur near Montreal.

With the opening of the Seaway, cargoes of iron ore were carried directly from the port of Seven Islands, Quebec, to Lower Lake ports in boats of 8,000 to 25,000 tons capacity. Since upbound iron ore movements are expected greatly to exceed other downbound bulk cargo movements, empty ore carriers returning to Seven Islands from Lake Erie ports can be expected to compete for available cargoes of coal. In the Lake Erie-Lake Superior movement of iron ore and coal, however, most of the new, large-bulk carriers prefer to return to Lake Superior ports from Lake Erie ports in ballast rather than to return with a shipment of coal. Thus, most of the coal shipped to Lake Superior ports is carried in 8,000 to 12,000-ton capacity boats. Such a situation may be expected for the St. Lawrence coal movement as well. In addition, harbour and unloading facilities, demand for small shipments of coal, and stockpile capacities will also limit the size of carrier used.

During 1957, Quebec consumed about 5,460,000 tons of coal, of which 3,000,000 came from the United States, 2,350,000 from the Maritimes and 110,000 from the United Kingdom. About one-half of the Quebec imports from the United States came via the Seaway. Besides the coal, about 500,000 tons of coke were consumed, most of this coke originating in the U.S. with very little coming through the Seaway. The volume of coal and coke from the U.S. coming via non-Seaway routes would suggest an immediate potential increase in traffic of up to 1,900,000 tons for the Seaway.

Intangible features affecting the suppliers of coal to the Quebec market are the size of subventions paid to Maritime coal producers and the effect of natural gas sales. Natural gas from western Canada first became available to Montreal in 1958. Within the next five years serious dislocations of both coal and fuel oil markets may be expected. After the main dislocation period, the remaining consumers of coal in Quebec should benefit from some decrease in shipping charges once definite shipping patterns and improved Seaway operation are achieved.

If large increases in Seaway coal traffic are realized, it will probably result from increased exports to Europe at the expense of U.S. east coast ports.

In the past, petroleum and petroleum products have constituted a significant portion of the old St. Lawrence Canal traffic. In general, shipments cannot be expected to increase significantly because of changing patterns in crude oil supply.

Non-Ferrous Metals, Iron and Steel

Although some zinc concentrates have been shipped to western Europe via the Seaway, nearly all are shipped by rail to U.S. smelters, most of which are situated inland. Copper concentrates produced in Canada in the vicinity of the Great Lakes and St. Lawrence Seaway are smelted mainly at Noranda, Quebec, and in the Sudbury area. There does not appear to be any reason for Canadian non-ferrous concentrates to be shipped through the Seaway in any significant amount unless a new market pattern develops.

Manganese and chromium ores are customarily imported by boat for consumption in the Montreal and Welland areas. This would suggest that the Seaway might bring about savings in ore shipment costs to the Welland area.

In general, the new Seaway transportation system is not expected to benefit the Canadian non-ferrous and ferro-alloy ore and metal industries greatly.

With the opening of the Seaway, both Canadian and U.S. steel producers in the Great Lakes area experienced competition from cheaper foreign steel, mainly from western Europe. The Seaway enables foreign shippers to penetrate further into the midwest. During the autumn of 1959, it was understood that steel fabricators in Toronto and Montreal placed several orders for steel with European suppliers for spring delivery at prices ranging from $20 to $28 per ton below Canadian rates. Similar low price quotations are not unknown in Chicago. If Canadian plants can meet this competition, states the report, and in general there is no overwhelming reason for saying that this cannot be done, the Canadian consumer will benefit in the long run.

Iron Ore

Since iron ore is the most important mineral commodity that will generate toll revenue, a large proportion of the study is devoted to the iron ore industry.

Last year, rising production from the Labrador-Quebec area enabled Canadian iron ore output to reach a new peak of nearly 22,000,000 l. tons. In Ontario, direct shipping and concentrated hematite ores, sinter, high grade pellets and magnetite concentrates are produced from open pit and underground mines. About 70 per cent of Ontario's shipments are exported to the U.S. In Newfoundland (Labrador) and Quebec, large tonnages of direct shipped hematite ores are produced from open pit mines astride the Labrador-Quebec border. In addition, high grade pellets are produced near Ottawa and high-phosphorus hematite is produced from underground mines on the east coast of Newfoundland. Most of the ore produced is for export to the United States.

Although the percentage of iron ore consumed in Canada from domestic mines is rising, all Ontario blast furnace operators use large amounts of U.S. Lake Superior ore. This is explained partly by past supply patterns established before 1939. It is also due to part ownership by Canadian steel firms of several U.S. mining companies.

The Labrador-Quebec district is the dominant iron producing area in Canada and it is from this district that the expected large Seaway iron ore traffic is to originate. At present Iron Ore Co. of Canada is the sole producer. This company, through its development at Schefferville, Quebec, is the Dominion's largest producer. In addition, three major projects are under way in the Quebec-Labrador region, while several more are being seriously explored. They are : Quebec Cartier's 8,000,000 ton development in the Mount Reed-Mount Wright area of Quebec, the Iron Ore Co. of Canada's 7,000,000 ton project in the Carol-Wabush Lakes area of Labrador, and the Wabush Iron Ore Co.'s 5,000,000 ton development in the same general area as the Iron Ore Co.'s project.

By 1965, shipments of iron ore from the Labrador-Quebec fields can be expected to rise to about 30,000,000 tons, and by 1970-75 to 50,000,000 tons.

The rail handling and water-transportation charges to Lake Erie or Pittsburgh from Lake Superior mines are over $2.00 per l. ton less than for ores coming from mines in Labrador-Quebec. One of the most important factors that permits Labrador-Quebec ore to compete is the State of Minnesota reserve tax.

In addition to the matter of competing routes, there are other factors affecting the volume of ore traffic through the Seaway. Many persons expect that the reserves of relatively inexpensive ore from the Lake Superior area will decline. Thus larger amounts of Labrador-Quebec ore will be required by plants on the Great Lakes.

Besides Labrador-Quebec ores, overseas ore must also be considered. Most Venezuelan, Brazilian, Peruvian, Chilean, Liberian and Swedish ores are unloaded at Atlantic coast ports. More Swedish ore might come through the new Seaway. As U.S. imports from all countries increase, a trend could develop whereby non-Canadian exports to the U.S. would obtain the main share of the east coast import market and increasing amounts of Canadian ore would be diverted through the Seaway.

NEW WORLDS FOR GEOLOGISTS

A PAINSTAKING mineralogical study of strongly sheared sandstone from Meteor Crater, in Arizona, for the purpose of studying the glass which might be formed as a result of impact by the meteorite, has led to an exciting find in what may well become a new field of scientific research—" space geology "—reports Mr. E. F. Bennett, Acting Secretary of the Interior, U.S. Government. On June 1, Dr. E. C. T. Chao, Geological Survey geologist-mineralogist, was examining specimens of strongly sheared Coconino sandstone and discovered that the sample contained coesite, a dense and highly stable form of silica not previously known to occur naturally on earth. In fact, it had been synthesized for the first time in a laboratory only a few years ago. The success of Dr. Loring Coes, Jr., in 1953, had been one of many quietly conducted long-term investigations of minerals subjected to extreme temperatures and pressures in laboratories throughout the U.S.

Like diamond, it had been predicted that extremely high temperatures and pressures are required for coesite, and that it could only be formed in the earth naturally at great depth. When repeated searching failed to uncover it among samples taken from the blue-clay diamond pipes of South Africa and from quartz samples subjected to shocks of several hundred thousand atmospheres investigators predicted it might never be found as a natural mineral. Even a kilo-ton nuclear device proved incapable of causing the transition. As recently as February 1960, Dr. F. R. Boyd and J. L. England of the Geophysical Laboratory, Carnegie Institution of Washington (who have duplicated both Coes' success at transposing quartz into coesite and General Electric's diamond experiments) announced that " Quartz could not invert to coesite in the earth at depths less than about 60 miles ".

Following Dr. Chao's initial positive identification of coesite, a team of Survey scientists helped to further verify and determine its chemical composition. Because of the immense scientific interest such verification is necessary. Three years ago Dr. E. M. Shoemaker, in the course of a geological investigation of shock phenomena by the Geological Survey on behalf of the U.S. Atomic Energy Commission, was struck by certain similarities between the formation of craters by nuclear explosion and the bowl-shaped depression near Canyon Diablo south of Route 66 near Winslow, known as Meteor Crater. Here thousands of small and large meteorites, mostly nickel-iron, have been found scattered over a wide area; more than have been collected anywhere else in the world. From his studies, Dr. Shoemaker finds the structure of Meteor Crater is such " as would be produced by a very strong shock originating at about the level of the present crater floor ".

All this points to the need, the Survey states, to establish now the beginnings of what might be called—" space geology " the study of rocks on other planets.

The implications of the discovery of natural coesite are manifold. The new mineral seems not to have any commercial value, but it has aroused considerable scientific curiosity. Knowing how coesite was first made science must now account for its presence in the strongly sheared Coconino sandstone of Meteor Crater, if it does not accept the thesis that here is strong evidence the Crater was truly formed by meteor impact.

Some Meteor Crater iron meteorites contain diamond. The meteorites in which diamond occurs show evidence of shock damage. At a meeting of the American Chemical Society in April this year, it was proposed by Michael Lipschutz and Professor Edward Anders of the Enrico Fermi Institute for Nuclear Studies, University of Chicago, that the meteoritic diamonds had been formed under high pressures and temperatures generated by the impact. They were formed on earth rather than in space. The discovery of " natural " coesite lends support to this interpretation. It also suggests that science take a second look at sheared siliceous rocks in other craters suspected of meteoritic origin. They too, may contain coesite. If so, this could provide a real reason for searching in other nickel-iron meteorites for additional diamond.

Even more intriguing perhaps, is the possibility that coesite someday may be found in rock samples from impact craters on the moon. Photos of the lunar surface show strong evidence that many lunar craters (those with radiating rays) have been caused by impact. If there are true impact craters, and if the rocks on the surface of the moon contain quartz, coesite possibly would be a major constituent of samples from the moon. Maybe diamonds, too. Also suggested by the new discovery, is the possibility that other hitherto unknown high temperature and high pressure minerals may be present in meteor craters. Certainly a unique research environment is being unfolded.

Development and Operation of El Salvador

We are indebted to "Mining Engineering" for permission to publish this abstract from their special issue of April 1960, which is devoted to a complete report on the development and operation of El Salvador mine and plant run by the Andes Copper Mining Co., a subsidiary of the Anaconda Co.

THE Potrerillos mine of Andes Copper Mining Co., a subsidiary of The Anaconda Co., was developed in the rugged, high Cordilleras of Chile in the early 1920's and it came into full production in 1927. Since then and until the closing of the mine in June of last year, 1,762,192 tons of copper were produced.

Over the past ten years it had become increasingly evident that the Potrerillos mine would be economically depleted before the year 1960. With visions of a ghost camp in prospect at Potrerillos and its attendant depressing effects upon Atacama Province, Chile and its people, and the losses, hardships and heartbreak incident thereto, the Anaconda Co. marshalled its technical personnel, physical assets, and capital in a concerted, accelerated effort to find and develop a copper mine tributary to the Potrerillos operations. This exploration programme resulted in the discovery of El Salvador.

Geology

El Salvador is a major porphyry copper deposit located along the trend of the Great Copper Belt of the Chilean Andes. The mine itself lies in Atacama Province about 75 miles from the coastal town of Chanaral and 20 miles from Potrerillos. The area is impressive because of widespread bleaching and alteration associated with acid porphyries intruded into predominantly dark-coloured andesitic host rocks.

The bare hills, the deep canyons and upland slopes of the Chilean pampa reveal the geology of that region in unique detail. The isolated prominence of Indio Muerto Peak, its significantly dissected sides, its variegated colouring, are all superficial features attracting attention to the site of El Salvador mine.

Primary sulphide mineralization occurred after the intrusion of the quartz porphyry. This mineralization is genetically related to the porphyries, but it is neither evenly distributed within nor confined to any one intrusive rock.

Most of the ore reserve at El Salvador is in a secondary chalcocite blanket that exhibits marked local irregularities and extreme variations in elevation of both its top and bottom. The orebody varies in thickness from a few feet at the edges to more than 950 ft. in its central portion and covers an area 1,700 x 4,000 ft. The light coloured igneous rocks of Indio Muerto Peak, with which it is associated, rise to 11,000 ft., approximately 3,500 ft. above a drab alluvial plain.

The present climate is arid, with less than ¼ in. annual rainfall at lower elevations. Infrequent local flash floods result from occasional storms, usually occurring in the higher mountains to the east.

Development

The following factors influenced the selection of a mining method : (1) An average ore grade of about 1.5 per cent total copper, with reserves of 375,000,000 tons ; (2) Initial production of 12,000 t.p.d., to be expanded to 24,000 t.p.d. ; (3) Ore zones ranging from 80 ft. to more than 1,600 ft. in horizontal dimensions and varying to 740 ft. in thickness, with an average thickness of about 425 ft. ; (4) An irregular ore zone bottom ; (5) A column of waste averaging 1,300 ft. in thickness overlying the ore zones ; (6) High degree of fracturing in the mineralized mass ; (7) Certain underground mining methods estimated to be cheaper and quicker than open pit mining.

After consideration of these factors, it was decided that block caving with gravity ore disposal was the method best suited to existing conditions. Accordingly, a plan of mining was devised which provided two haulage levels, referred to by their elevations in meters above sea level as the 2,600 and 2,660 levels. Development was started by driving from surface at both horizons. Each of the two levels, which are operated simultaneously, has two sections separated by an unmineable interval. Each section will eventually have two blocks in full production with other blocks in various stages of development. Under these conditions the mine will have capacity to produce 24,000 t.p.d. on three shifts.

The ore is hauled to either of two ore pass locations for gravity disposal to ore bins feeding a main adit haulage system that leads directly to the coarse crushers at the concentrator.

Level Development : The decision to have two mining levels was influenced by the average elevation of the bottom of the major part of the orebody and the adverse diluting effect an attempt to reach all the developed ore from one level would have. The 2,600 and 2,660 haulage levels were selected at such elevations that each of the two mining levels, 75.4 ft. above the haulage level, coincides with the bottom of most of the developed ore with a minimum inclusion of low grade material.

A loop traffic pattern on the haulage levels provides one-way movement of ore trains to and from the dumping stations and in the crosscuts under the blocks.

Within the mining areas the haulage crosscuts are driven on 78.7 ft. centres in order to provide for a four-grizzly main-raised system. All drifts and crosscuts on the haulage level have 10 x 12 ft. rock dimensions. The ground is extremely variable in hardness and competence and calls for a corresponding variation in drilling, blasting, and ground support methods.

Most blocks are 157.4 ft. wide by 164 ft. long. Width is determined by haulage drift spacing and length by multiples of the grizzly drift spacing. From the two haulage crosscuts under each block a branched raise system, lying all in one plane, connects to the grizzly level 52.5 ft. above. From the main raises, which intersect the floor of the grizzly drifts on 19.7 ft. intervals, branch raises on both sides of the grizzly drift lead to the undercut level 23 ft. above to give a drawpoint pattern having a unit dimension of 19.7 x 20.5 ft.

Undercutting is performed by drilling and blasting out the pillars remaining between branch raises and between undercut drifts.

Slusher Block Development : In an important area of the mine, on the 2,600 level, recent development has shown that the ore bottoms at the haulage level, or close to it. The conventional gravity block layout, therefore, would sacrifice considerable mineable ore. To recover this ore a system of slusher mining was decided on that would permit lowering the mining level to the minimum elevation above the haulage level, already partly opened up in the area.

Ore Haulage : Car loading is controlled by manually-operated arc-type gates. Each ore train is composed of 12 5-ton cars drawn by a 10-ton trolley locomotive. Multiples of car lengths match the chute interval so that cars under adjacent chutes are loaded simultaneously. Ore is dumped into any one of four ore passes leading to bins directly above the Inca adit level.

A two-way radio dispatching system with a microphone and speaker on each locomotive is used to control all train movements from a central dispatching point on each haulage level. This system is supplemented by a conventional hand-operated signal light system.

Sub-level drifts at 107 ft. intervals connect by short cross-cuts to each ore pass and to the manway providing access. At sub-levels 1, 5, and 7, air-operated gates are installed for control of ore flow.

Ore Bins : The ore passes discharge through air-operated control gates into cylindrical vertical ore bins of 1,500-ton capacity, each 125 ft. high and 18 ft. in diameter. The 50-ton cars on the Inca adit level are loaded from the ore bins through air-operated drop lip gates, which discharge into the continuously moving train.

Inca Adit : The Inca adit takes its name from the Inca Trail, dating from pre-Spanish days, which is clearly visible within a short distance from the portal. The Inca adit was driven as a main haulage level to receive all ore by gravity from the two levels presently working and from subsequent levels which may be developed at a future date. Its elevation, about 8,000 ft. above sea level, is 730 ft. below the lowest present undercutting horizon and is expected to be below all anticipated downward extensions of the orebody. The work done to date on this level amounts to 16,400 ft. of tunnel, including a spur 1,640 ft. long to the north side ore pass system. In cross section it is a 14 x 17 ft. horseshoe inside rock or timber measurements.

The ore is hauled on this level in 40-ton drop-bottom cars that are loaded, without stopping train movement, from two chutes under each ore bin which are 16 ft. apart.

Ventilation : Early in the development of El Salvador it was decided to use the exploration tunnels and inclined shaft as principal ventilation openings, supplemented by additional openings as needed. The primary ventilation system was established on the principle that means of ingress should also be sources of fresh air. The main fans at the collar of the exploration shaft exhaust 300,000 c.f.m. at a pressure loss of about 6 in. water gauge and the three tunnels presently serve as the source of most of the fresh air.

The safety and ventilation department at El Salvador occupies a spacious building at the 2,600 level mine yard which provides offices, laboratories, and a lecture hall for training classes. The department is organized as follows : (1) mine safety and fire prevention, (2) mine ventilation and industrial hygiene, (3) plant and surface installation safety, (4) fire control and prevention, and (5) traffic control.

All working places are inspected daily by the safety department inspectors, who work on all shifts when the mine is operating. These men supplement on-the-spot instructions with reports directed to mine supervision.

Metallurgical Operations

In general the copper minerals are finely disseminated in gangue minerals and require fine grinding for liberation and recovery. Molybdenum, a by-product of substantial economic importance, occurs in the orebody as molybdenite. The friability of the ore indicated that the mine product would have a high percentage of fines.

Metallurgical operations for recovering copper from El Salvador ores are divided between the new crushing plant and concentrator at El Salvador and the old filtering and smelting plant at Potrerillos. Concentrates are moved from the mill at El Salvador to Llanta by pipeline, then loaded into railroad cars and transported to Potrerillos.

The following summary is by Leonard O. Fines, assistant manager of the Andes Copper Co.

Ore from El Salvador's block caving operations is reduced to—6 in. by two 30 in. gyratory crushers. After the undersize has been screened out, the remaining material is further reduced to —$\frac{5}{8}$ in. by two secondary standard cone crushers and four tertiary shorthead cone crushers. Four 24 in. belt conveyors, assisted by gravity flow, transport the ore directly to the feed end of the rod mills in the concentrator's grinding units, which produce a flotation feed of 5 to 6 per cent + 65 mesh and 60 per cent—200 mesh.

The 24,000-ton concentrator consists of four 6,000-ton independent sections, each with grinding, flotation, thickening, and regrind facilities. Each is designed to handle a maximum flow of 7,500 dry s. tons per day but can operate at any desired feed rate.

Pulp from the cyclone overflow of each section passes to two rows of 28-cell machines for preliminary bulk flotation. The milk of lime modifier is added to the rod mill ahead of flotation for proper mixing. A small amount is also added in the regrind mill to maintain the same alkalinity in roughers and cleaners. Collectors are used with pine oil as a frother, and provisions are made for stage addition of collectors and frothers to various parts of the flotation circuit. Froth from the bulk and scavenger flotation is thickened prior to regrind.

Four 9 x 12 ft. regrind mills grind the thickened product to 90 per cent —325 mesh for the cleaner-recleaner-scavenger flotation, and the scavenger and rougher tails are combined to make the final tail. Final concentrate runs 45 to 50 per cent Cu, which is conducive to production of high-grade matte for economical smelting.

The final cleaner concentrate is piped to a molybdenum concentrate thickener, where a cleaner-recleaner operation yields a floated product of molybdenum concentrate and a tailing of final cleaned copper concentrate ready for pipe-tank-rail delivery to the smelter at Potrerillos.

The final tailing, which consists of dewatered bulk and scavenger tailings of 45 to 50 per cent solids, is sent to the tailing disposal area through a lined canal. All thickener overflow water, together with concentrate thickener overflows, is returned to the concentrator head tanks for re-use in grinding and flotation circuits.

A 12.7 mile pipeline carries the final cleaned copper concentrate pulp from El Salvador to a railhead 2.8 miles above Llanta, where it is received by two 40 x 25 ft. settling tanks, each provided with a still well. Each tank has a capacity of 1,000 tons of concentrate. The slurry, after settling for a short period of time, decants at approximately 70 per cent solids. Decanted water is removed to sump ponds through pipes at various levels on the side of the tank. The thickened pulp is discharged by spigot into railroad cars provided with splash plates to prevent spillage during transport. Each car has six bottom-discharge doors.

Filtration of thickener discharge is accomplished on four to five 12 x 14 ft. disc filters. Cake is produced at a thickness of $\frac{5}{8}$ to $\frac{3}{4}$ in., with moisture from 11 to 14 per cent.

Concentrate is conveyed to wedge-type roasters, where it is further dried to 6 per cent moisture. The dried concentrate is loaded into hopper cars and trammed to a newly designed reverberatory furnace of 1,000-ton capacity. This magnesite and silica suspended-arch furnace produces a matte grade of 60 per cent Cu to feed the four 12 x 26 ft. converters. Copper produced by the converters is cast in 700 lb. blister cakes.

Equipment at the Potrerillos smelter has been modified and enlarged to handle an anticipated copper production of about 100,000 s. tons a year.

Machinery and Equipment

Pneumatic Tipping for Mine Ore Cars

An interesting development by Lang Pneumatic Ltd., is the production of specially designed, large-bore air cylinders which are being used in the pneumatic tipping gear for mine ore cars made by Robert Hudson Ltd. During the past two years, these cylinders—the largest made for this purpose—have been work-tested in Africa, tipping 25-ton mine ore trucks.

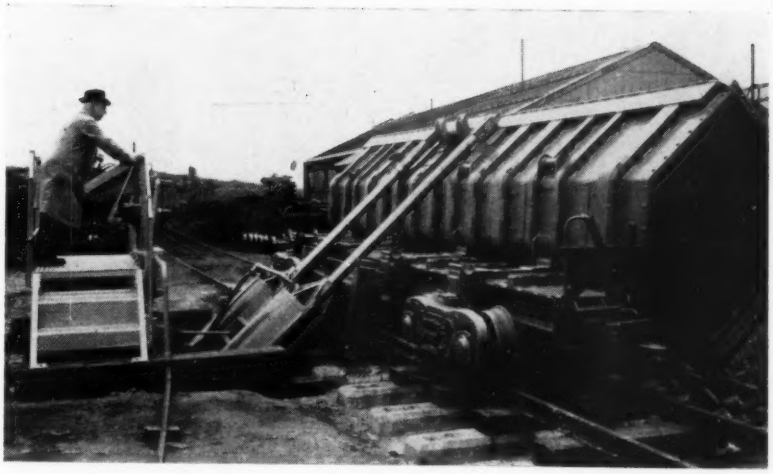
Recently, further orders for similar equipment have been executed by Lang Pneumatic. These are being delivered to Robert Hudson Ltd., for assembly and despatch to Africa. As well as supplying the main cylinders and pneumatic components, Lang Pneumatic also co-operated in the detail design of the tipping gear.

The cylinders, of 20 in. dia. bore, are made of spun cast steel tube, the bore being finished in hard chrome. The stroke is 6ft. 6in. End covers and trunnion bracket are of Meehanite. Each complete cylinder weighs approximately 3½ tons.

Before the main tilting cylinders can be operated, clamping and positioning cylinders, actuated by manually operated 4-way valves mechanically interlocked, ensure that the trunk chassis is clamped to the tracks and the tilt cylinders are in their correct positions in brackets on the side of the car body. A sequence valve, which directs air to the pilot of a normally closed shut-off valve in the blank end of the tilt cylinders, ensures that they cannot be extended before they are in place.

A pressure regulating valve maintains 40 p.s.i. on the blank end of the tilt cylinders and a hand operated 3-way valve, spring loaded to the open position, directs 80 p.s.i. to the rod end. When the spring loaded lever to the control valve is operated air is bled from the rod end of the cylinders proportional to the movement of the lever. As the pressure drops, the 40 p.s.i. in the blank end extends the cylinder.

It is unnecessary to completely exhaust the rod end. Some residual pressure cushions the movement and the load cannot tip too fast. Release of the valve lever directs 80 p.s.i. to the rod end and the cylinders retract. Air trapped in the blank end escapes through a pressure relief valve set at 45 p.s.i.



A 25-ton ore truck in the fully tipped position. Lang Pneumatic Ltd. worked in close co-operation with Robert Hudson Ltd., in the detail design of the tipping gear as well as supplying the main cylinders and pneumatic components

ELECTRONIC COMPUTER AIDS METALLURGICAL RESEARCH

Examples of how a small automatic electronic computer is used economically for both routine and complex calculations required in metallurgical research are given in a new U.S. Bureau of Mines report. The report summarizes three years' experience in using the computer part-time to perform calculations required in basic experiments in making iron, steel and other metals. Of 32 separate applications, four examples are described in detail. When not used in connection with metallurgical research, the computer maintains a regular schedule devoted to other scientific and economic studies at the Bureau's Pittsburgh laboratories.

Speed and accuracy are the major advantages stressed by the Bureau in suggesting use of small general-purpose digital comupters as " practical tools for most research laboratories ". These are contrasted with extremely costly large machines which can do miraculous things, but also are beyond the reach of most researchers.

Copies of Information Circular 7959, *Applications of a Small Electronic Digital Computer to Pyrometallurgical Research*, can be obtained only from the Superintendent of Documents, Government Printing Office, Washington 25, D.C., at 40 cents each.

NEW WIRE BRAIDED HOSE

The comprehensive range of Goodyear industrial hoses is further increased with the introduction of Wingflex high pressure wire braided hose.

Wingflex is made in 1 or 2 braid constructions for use with machine and pneumatic tools, earthmoving equipment, compressed air units and similar industrial applications. It is supplied in bore sizes ranging from 5/32 in. to 2 in. with either re-usable or swaged couplings. (The re-usable coupling is invariably supplied with 1 braid hose—i.e. where pressures are relatively low—and swaged couplings with 2 braid hose or where excessive flexing occurs.) The re-usable couplings include male and female couplings as well as elbow couplings manufactured with either 45 deg., 60 deg. or 90 deg. angles.

Consisting of a seamless and oil-resistant synthetic rubber tube with a smooth bore, the hose is designed to operate throughout a range of pressures varying from 600 to 4,000 p.s.i. in the 1 wire braid construction and from 1,000 to 5,000 p.s.i. in the 2 wire braid construction. It is reinforced with high tensile steel wire which is uniformly braided over the lining. The cover is made of synthetic rubber compound (resistant to abrasion, oil, light and flame) and the complete hose is uniformly vulcanized and concentric throughout its length.

Wingflex will be supplied in either 60 ft. lengths uncoupled or in lengths coupled either with re-usable couplings or the swaged type couplings. Every single assembly is tested individualy. Couplings are designed to withstand pressures well in excess of the burst pressure of the hose.

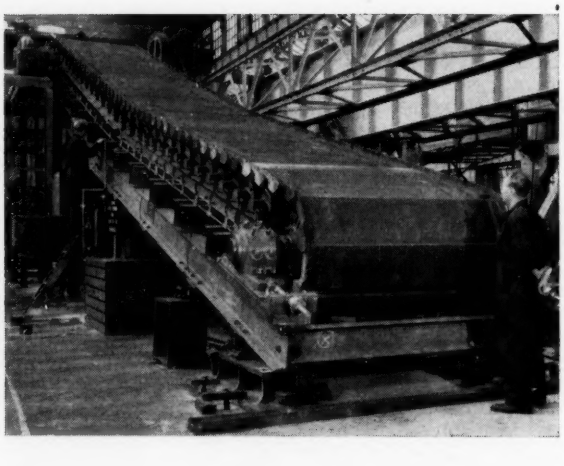
LAGGING FOR CONVEYOR DRUMS

A method of lagging conveyor drive drums which will give a 100 per cent drive in very wet and/or slimy conditions, has been devised in the Durham Division, N.C.B. It has already been adopted widely in the division, and is proving successful, particularly on wet coalfaces.

The idea is to mould a lagging of suitably prepared fire-resistant neoprene directly on to the steel case of each drum of any conveyor drive unit. It is necessary for this work to be done by a manufacturer with experience in this field of equipment. After the moulding has been completed the surface of the neoprene is ground down until the required drum diameter is reached, leaving at all times a thickness of at least ⅜ in. of neoprene. A special tool is then applied to the surface to give a patterned tread — in Durham Division an equal diamond pattern has proved very suitable.

Experience has shown this neoprene lagging to have a life six times greater than any other method used.

MINING MISCELLANY



A pan feeder by Fraser and Chalmers Engineering Works of The General Electric Co. on a contract at nearly £75,000 for Associated Portland Cement Manufacturers Ltd. for a 200 t.p.h. limestone crushing plant in Nigeria

A company to study the building of a harbour at Pointe-Denis in the Gabon, necessary for the shipping of iron ore from the Mekambo reserves, has been set up in Libreville with the name of Société d'Amenagement de la Pointe-Denis. The shareholders are Compagnie Commerciale l'Afrique Equitoriale Française, Bethlehem Steel, Compagnie de Suez and Banque de l'Afrique Occidentale.

★

Elliot Automation Ltd. have secured an order for automatic electronic weighing equipment for Penarroya's Noyelles-Godault works, where Imperial Smelting plant is being installed under licence.

★

The Belgian consortium, Syndicat Belge d'Entreprises a l'Entranger, has stated that it is interested in the erection and financing of a zinc refinery in the central Andes of Peru. Initial plans foresee investments of some $U.S.10,000,000 and a construction time of two years. A similar refinery with a capacity of 30,000 t.p.a., is at present being built by Belgian interests in Mexico.

The Magnohrom concern of Kraljevo. in the Yugoslav Republic of Serbia, has begun a 3,500,000,000 dinar expansion programme designed to increase its annual production of sinter magnesite from 87,000 tonnes to over 150,000 tonnes and of fireproof tiles from 30,000 to 55,000 tonnes. The plant is being equipped by Fried. Krupp A.G. at a cost of $2,500,000 and is to be completed in its expanded form by September 30 next year, after which date Magnohrom plans to increase exports.

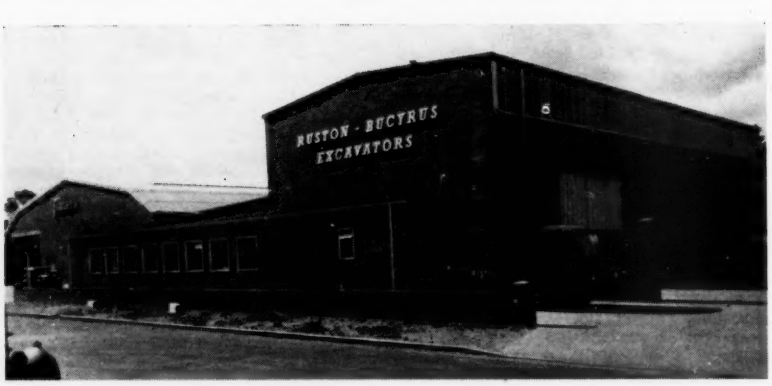
★

The Schäferitz brown iron ore mine in Austria, which has been exploited for a hundred years, has ceased production owing to exhaustion.

★

Hungary has completed the construction of a perlite dressing and grinding plant at Palhaza, centre of one of the richest perlite deposits in the world. Production is starting almost immediately. The capacity of the plant is expected to rise from 4,000 tonnes this year to 24,000 tonnes in 1961 and 60,000 tonnes in 1963.

Recently, Ruston-Bucyrus Limited, held an open day at their new depot, which actually commenced business on May 30. The depot carries an extensive range of spares for machines from ¾ to 2½ cu. yd. capacity, including engine spares for the corresponding Ruston engines. Dragline bucket spares and spares for various front-end equipments on the smaller machines are also kept in the depot stocks



A company known as Société du Djebel Onk has been formed in Algeria for the exploitation of extensive phosphate deposits in the Onk hills some 200 miles south of Bône. Production from the deposits, which are estimated to contain over 500,000,000 tonnes, is planned to be at an annual level of 800,000 tonnes of 75 per cent phosphate. The total costs to the start of extraction, including the cost of a 60-mile railway to Tebessa, are put at N.F. 130,000,000. The operating company belongs 40 per cent to the Compagnie des Phosphates de Constantine, 34 per cent to the French Government, and 26 per cent to Algerian development companies and private shareholders.

★

Beryllium Resources, Inc. has signed an agreement with the Mexican Government to explore for beryllium and mine it. By agreement with Brush Beryllium, the two firms will design and construct as many beryllium extraction plants in Mexico as are needed if exploration uncovers sufficient ore deposits for development.

★

Bauxite deposits are reported to have been located in the Koraput área by the Geological Survey of India.

★

In the period 1960 to 1965, Yugoslav copper output is to be increased by 42,000 tonnes a year, aluminium by 16,000 tonnes, zinc by 38,000 tonnes, and coal by 10,000,000 tonnes (to an annual level of 32,000,000 tonnes).

★

Romanian coal output will be running at over 12,000,000 tonnes a year by 1965, the target year of the new six-year plan, it was stated at the annual Communist Party conference in Bucharest. This compares with a 1959 national production of only 7,900,000 tonnes. Output of ingot steel will be raised from 1,400,000 to 3,300,000 tonnes. By 1970 the planned ferrous metal combine to be built at Galati and brought into operation in 1965 will be running to its full capacity of 4,000,000 tonnes. Other outputs scheduled for 1965 include 12,200,000 tonnes of mineral oil and 13,300,000,000 cu. m. of natural gas The corresponding figures for 1959 were 11,400,000 tonnes and 5,700,000,000 cu. m.

★

Seven diesel-electrics, each developing 1,320 h.p., have been ordered from International General Electric, by the Compagnie Minière de l'Ogooue, a French company formed to develop the rich manganese deposits of Ogooue. Total cost of the locomotives is approximately $U.S.1,500,000. The ore will be hauled 60 miles by cableway to M'Binda. It will then be loaded into railway cars for the 300-mile trip to the coast at Point-Noire, where storage and loading facilities are being constructed.

The Indian Government has sent mineralogists to investigate possible gold deposits reported in the Gharwal and Chamoli districts, where it is claimed that gold has been extracted by washings from the Alaknanda river and tributaries. Prospecting is also being carried out for copper, which is known to exist in Tarakhani, but the economic potentialities have yet to be ascertained.

★

A group of mining engineers of the East German brown-coal mine VVB Braunkohlewerk Cottbus is reported from East Berlin to have developed an isotopic control unit, using the radioactive isotope Co-60, which applies the brakes of pit trains which might overrun stop signals. The passing of signals set at stop, say the East German authorities, accounts for 40 per cent of all pit collisions.

★

International Iron Mines are planning to spend $2,000,000 to bring their Zeballos iron ore property on Vancouver Island into production. Machinery valued at $450,000 has been shipped to the site. The company is negotiating with Japanese interests to export substantial quantities of concentrates to Japan. It is intended to mine 3,200 tons of ore daily, yielding 2,600 tons of concentrate.

★

The government of the South German State of Baden-Württemberg has given permission to four German prospecting companies to seek uranium deposits within the State boundaries. The areas in which prospecting will be carried out are around Wolfach, Badenweiler, Lahr, Oberkirch and Belchen. The exploration costs, estimated at DM.1,500,000 are to be met 53 and one-third per cent by the Federal Government, 13 one-third per cent by the State government of Baden-Württemberg and 33 one-third per cent from private sources.

★

U.S. Borax and Chemical Corp. is installing a 1,300-ft. conveyor system at its open pit in Boron, California. The system, which has a vertical lift of 315 ft., will provide a continuous link between mine and plant. Open pit mining began in Boron in 1956 and today the pit is 2,000 ft. long, 1,700 ft. wide and 275 ft. deep, with estimated reserves to last over 100 years at current production rate.

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With the completion of a three-mile roadway connecting the township of Klian Intaa in North Perak with Gunong Paku mining operations will be resumed by Rahman Hydraulic Tin. The company owns six blocks of tin mining properties comprising 1,327 acres, near Klian Intan, equipped with an hydroelectric system, hydraulic mining plant and crushing mill. The property was evacuated in December, 1941, reoccupied in November, 1945, and production re-commenced in late 1946. Terrorist activities hampered work since mid-1948, and operations were suspended in December, 1955, although tributors continued to work on parts of the property. Tin mining in the Intan district has been carried on since the 17th century. Rahman Hydraulic Tin was incorporated in the Straits Settlements in May, 1907.

Following the outstanding success achieved with a Euclid TS-24 on a contract with the Western Excavating Co. Ltd., a further two machines have been ordered. The job on which the three machines will be engaged is particularly interesting—it consists of the removal of a complete hill of China clay sand. The hill is approximately 200 ft. high and at its base covers an area of roughly 10 acres. The units climb to the peak unassisted up 1/3 grade for a distance approximately of 300 yds., and then load down hill before travelling a distance of 1 mile to the dumping area. The machine already operating is completing five trips per hour over the 2 mile cycle

As from July 1, 1960, the Pakistani Government has put ferrous and non-ferrous metals on its open general licence for uncontrolled imports. Explosives and scientific instruments were among other goods transferred to this list.

★

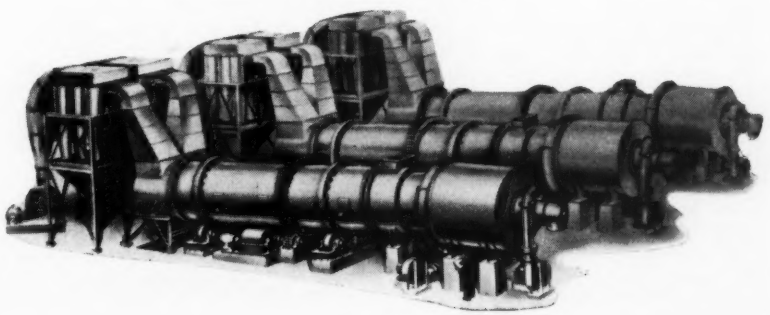
One of the longest belt conveyor systems in the world is being installed in Chile for West South American Overseas Corp. The system, which is 11 km. long, will transport iron ore downhill from the Carmen mine of Cia. Minera Santa Fe at an annual rate of 1,500,000 tons.

According to East German sources, Freiberg zinc blende from the deposits around Freiberg-in-Saxony, contains from 0.085 to 0.1 per cent indium, up to 0.005 per cent thallium, 0.0009 per cent germanium and 0.0005 per cent gallium.

★

The governor of Catamarca Province, Argentina, has announced that exploration of the Farallon Negro mineral deposits has disclosed a seam of considerable length, the three principal minerals being gold, manganese and silver. Installation of a plant for extracting these minerals is being considered.

Head Wrightson Stockton Forge Ltd., a subsidiary of Head Wrightson and Co. Ltd., is supplying to Richard Thomas and Baldwins Ltd., six rotary dryers for an iron ore drying plant costing approximately £240,000. Three of these machines, each of which measures 45 ft. long by 10 ft. in dia., will be installed at the Redbourne works and three at the Spencer works of Richard Thomas and Baldwins. Each installation is capable of handling a weekly output of 21,350 tons of ore processing from 0 to 2½ in. The rotary dryers are arranged in parallel flow and each have a rated capacity of 50 tons per hour when drying from 20 per cent moisture down to 9 per cent



Metals and Minerals

Expansion of Aluminium Consumption

Consumption of aluminium has been rising fast in most countries, even if the performance of the U.S. domestic market has not fully realized the perhaps over-sanguine expectations with which the year began.

In Britain consumption during the first half of 1960 has increased even more sharply than in 1959, when total sales jumped by 17 per cent to approximately £135,000,000, most of this gain being achieved during the latter part of the year. During March despatches of wrought and cast products reached the record figure of 34,276 tons and the total for the first quarter amounted to 97,285 tons. Sales must doubtless be affected to some extent by the impact of the government's measures to ease the strain on the economy, which have already led to some reduction of sales volume in the consumer goods field, as well as some slowing down in the motor industry's overall rate of production. Moreover, the building up of stocks at all stages of the aluminium processing and consuming industries was a factor which contributed in no small measure to the sharp rise in aluminium sales.

Although the immediate outlook would appear to be for some slowing down in the rate of increase, there seems little reason why the overall growth in demand should not continue, particularly having regard to the highly competitive conditions now prevailing in the U.K. industry, in which all the four major North American producers with their immense technical resources and know-how and their unrivalled experience in the marketing of aluminium are now firmly established. Despite some hesitation of demand by customers in the domestic appliances field, there is every indication that the present year will see new records established by every section of the industry.

In the United States this year's production of primary aluminium at somewhere between 2,850,000 and 2,875,000 tons is expected to be the highest in history. Despite the lethargic market so far this year, the *American Metal Market* considers that the *per capita* annual consumption will rise by at least two pounds. U.S. consumption of aluminium during 1959 amounted to approximately 27 pounds per person This figure is based on the indicated use of approximately 2,479,500 tons of aluminium during the year, divided by an estimated population of about 175,000,000. Shipping volume during the first five months of 1960 was running at an annual rate of about 2,525,000 tons. Using the same population basis, this would indicate a new peak in *per capita* use of approximately 29 pounds. The shipping data for last year, as well as current estimates, include direct military requirements but are exclusive of shipments to government stockpiles.

Although there is some divergence of opinion as to the outlook for the remainder of the current year, there is no expectation at present that demand for 1960 as a whole will drop below the current level. In general, the industry still abides by its earlier forecast of an improvement of up to 10 per cent over 1959.

*

Aluminium Ltd. has announced that Ghana Aluminium Products Ltd., its associated company in Ghana, will expand its operations at Tema by the installation of an aluminium rolling mill next to its existing factory. The new project will cost approximately $2,750,000 and production is scheduled to begin early in 1962. The mill will be able to serve the entire market requirements of Ghana for aluminium sheet products. Until the completion of the Volta River project, involving the establishment of an aluminium smelter, imported aluminium ingot will be used.

Ghana Aluminium is jointly owned by the Ghanaian Government and Aluminium Ltd.

*

The Commerce Department at Washington has turned down a request from secondary aluminium smelters to limit U.S. exports of aluminium scrap. The request was made by Mr. Carl H. Burton, secretary, Aluminium Smelters Research Institute, of Chicago, who contended that a U.S. shortage of scrap was imminent. In his reply to Mr. Burton, the Assistant Secretary of Commerce stated that there was at present no perceptible scrap shortage nor was one foreseen in the immediate future. Further, no indication could be found of inflationary impact of the general economy caused by aluminium scrap exports.

*

Hungary and Poland have signed a trade agreement covering aluminium trade worth 250,000,000 roubles. According to the Hungarian news agency MTI the agreement covers the period 1965 to 1970. During this period Hungary will deliver to Poland greater quantities of bauxite than had previously been specified in return for increased exports from Poland of aluminium ingot.

*

Alcoa has acquired mining rights on 30,000 acres of bauxite bearing land in Clarendon, Jamaica, reports Barclays Bank D.C.O. A construction programme involving the creation of a port, harbour and transport facilities is to be started at the end of this year. This development programme will be spread over 2½ years and Alcoa are said to be planning for mining operations to begin in 1963.

LONDON METAL AND ORE PRICES, JULY 14, 1960

METAL PRICES

Aluminium, 99.5%, £186 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £190 per ton
Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 10s. 6d. lb.
Cerium (99%) net, £15 0s. lb. delivered U.K.
Chromium, Cr. 99% 6s. 11d./7s. 4d. lb.
Cobalt, 12s. lb.
Germanium, 99.99%, Ge. kilo lots 2s. 5d. per gram
Gold, 250s. 0d.
Iridium, £23/£26½ oz. nom.
Lanthanum (98%/99%) 15s. per gram.
Magnesium, 2s. 2½d./2s. 3d. lb.
Manganese Metal (96%/98%) £275/£285
Nickel, 99.5% (home trade) £600 per ton
Osmium, £20/£25 oz. nom.
Osmiridium, nom.
Palladium, Imported, £8 12s. 6d.
Platinum U.K. and Empire Refined £30 5s.
Imported £28½/28⅝
Quicksilver, £70/£70½ ex-warehouse
Rhodium, £44/£48 oz.
Ruthenium, £14/£20 oz. nom.
Selenium, 50s. 0d. per lb.
Silver, 79½d. f. oz. spot and 79½d. f'd
Tellurium, 25s. 0d. lb.

ORES AND OXIDES

Antimony Ore (60%) basis	20s. 0d./21s. 0d. per unit. c.i.f.
Beryl (min. 10 per cent BeO)	210s./220s. per l. ton unit BeO
Bismuth	30% 5s. 0d. lb. c.i.f.
	20% 3s. 0d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (semifriable 48%) (Ratio 3 : 1)	£15 5s. 0d. per ton c.i.f.
" Hard Lumpy 45% (Ratio 3 : 1)	£15 10s. 0d. per ton c.i.f.
" Refractory 40%	£11 0s. 0d. per ton c.i.f.
" Smalls 44% (Ratio 3 : 1)	£13 5s. 0d. per ton c.i.f.
Baluchistan 48% (Ratio 3 : 1)	£11 15s. 0d. per ton f.o.b.
Columbite, Nigerian quality, basis 70% combined pentoxides (Ratio 10 : 1) Nb_2O_5 : Ta_2O_5	175s./180s. per l. ton unit c.i.f.
Fluorspar—	
Acid Grade, Flotated Material	£22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF_2)	156s. 0d. ex. works
Lithium Ore—	
Petalite min. 3½% Li_2O	50s. 0d./55s. 0d. per unit f.o.b. Beira
Lepidolite min. 3½% Li_2O	50s. 0d./55s. 0d. per unit f.o.b. Beira
Ambigonite basis 7% Li_2O	75s/85s. per ton f.o.b Beira
Magnesite, ground calcined	£28 0s./£30 0s. d/d
Magnesite Raw (ground)	£21 0s./£23 0s. d/d
Manganese Ore Indian—	
Europe (46%-48%) basis 67s. 6d. freight	73d./75d. c.i.f. nom.
Manganese Ore (43%-45%)	69d./71d. c.i.f. nom.
Manganese Ore (38%-40%)	nom.
Molybdenite (85%) basis	8s. 11d. per lb. (f.o.b.)
Titanium Ore—	
Rutile 95/97% TiO_2 (prompt delivery)	£28 0s. 0d. per ton c.i.f. Aust'n
Ilmenite 50/52% TiO_2	£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)	156s./162s. per unit c.i.f.
Vanadium—	
Fused oxide 95% V_2O_5	8s./8s. 11d. per lb. V_2O_5 c.i.f.
Zircon Sand (Australian) 65-66% ZrO_2	£16/£16 10s. ton c.i.f.

QUICKSILVER CONSUMPTION RISES

Industrial consumption of quicksilver in the U.S. rose in the first quarter of 1960 by 11 per cent as compared with the previous quarter and amounted to 13,600 flasks. Imports declined by 70 per cent to 2,186 flasks from 7,314 tons in the previous quarter. Last year they totalled 30,260 flasks. Of the year's first quarter imports Spain accounted for 1,330 flasks, Yugoslavia for 265 and Italy for 250. The balance came from Mexico (163), Canada (132) and New Zealand (46). On March 31, 1960, consumers' and dealers' stocks stood at 10,300 flasks, which compares with 11,700 flasks on December 31, 1959, and 10,600 at the end of 1958.

U.S. mine production of quicksilver in the first quarter of this year fell to 7,010 flasks and was the lowest quarterly output in three years.

Quicksilver prices kept fairly stable during the quarter, ranging from $211-$213 a flask at the beginning of the period to $214-$216 at the end, and averaged $212.40 a flask. The quarterly average was $5.61 a flask less than that of the preceding quarter and was the lowest in six years.

At the time of writing the current range of quicksilver prices in New York is $209-$212 per flask. Demand has been at a low ebb and there appears to be nothing on the horizon to indicate any improvement in consumer interest in the immediate future.

TITANIUM ENGINE CASING

A third-stage Minuteman missile rocket engine with a case made from a titanium alloy has been test-fired by the Aerojet-General Corporation in California. Aerojet is a subsidiary of General Tyre and Rubber Co. This is claimed to be the first time that a working rocket motor case has been made from titanium. Previous attempts to fabricate titanium alloys had been unsuccessful due to difficulties encountered in welding and heat-treatment. The use of titanium will give the third-stage Minuteman a saving of 30 per cent in weight as compared with steel rocket engine cases, resulting in an extra range said to be measurable in "hundreds of miles." It was stated that this engine casing, if adopted by the U.S. Air Force, could rejuvenate the titanium market. The alloy used is said to consist of 90 per cent titanium, 6 per cent aluminium and 4 per cent vanadium.

In general, the titanium consumption picture in the U.S. is reported to be brightening and is expected to continue improving. The metal is gradually getting more attention in space, missile and other market areas. The development of new alloys and improved forming methods continues and increased application in the chemical equipment is reported. A survey by the National Association of Purchasing Agents indicates expanding consumption, due mainly to titanium's good resistance to heat and corrosion, coupled with its often advantageous strength-weight ratio.

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Both in London and New York the platinum markets continue to be quiet and this condition is now tending to be accentuated by seasonal considerations.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

The week's activities have been dominated by reports from the Congo and interest in tin, lead and zinc has remained at a holiday level. As a result, the copper price has shown a considerable increase whilst prices for the other three have remained about the same.

COPPER POSITION STILL BASICALLY UNCHANGED

At the end of last week news from the Congo imparted a firmer undertone to the copper market and on Monday when the news came that the Union Minière mines had a shut down, the market experienced a sharp rise. The advance, however, was lost the next day on reports that European officials were returning and that production would probably start again in the near future. At the time of writing, the position is still unclear and it would be wise to read any optimistic reports with caution.

The overall picture is still one of overproduction, as offtake in the U.S. remains at a low level and elsewhere the higher prices and holiday season are having their effect on demand. On the London Metal Exchange turnovers have tended to increase and with more prompt metal becoming available the backwardation has tended to diminish. The official stocks on Monday showed a rise of 295 tons to a total of 3,735 tons.

Prices outside the U.K. have remained the same, except that the Belgian price has been increased from approximately the equivalent of 31.30 c. per lb. to 32.45 c. per lb. delivered Antwerp/New York. In the U.S. the commodity market has risen and the customs smelter buying price for No. 2 scrap has been raised to 25 c. per lb.

TIN REMAINS FIRM

The tin market has maintained its firm undertone although offerings of cash metal have tended to increase and thus the backwardation to diminish. The official stocks showed an increase of 301 tons to 9,049 tons. The Singapore market has also been firm with turnovers maintained at a fairly high figure.

The technical position on the London market arising from the operations of the buffer stock manager is now easing, and with the holidays diminishing the demand for cash metal it would not be surprising if the backwardation decreased still further, although it is not expected that the price level as a whole will recede.

On Thursday the Eastern price was equivalent to £812½ per ton c.i.f. Europe.

OUTLOOK FOR LEAD-ZINC PRICES

The turnover in both the lead and zinc markets has suffered from the holiday season, whilst the price of the former has tended to decline and that of the latter to firm up slightly. Demand in the U.K. for both metals remains good but in the U.S. demand is disappointing and some producers of zinc have reduced the premium for the higher grades of metal to 1½ c. per lb. for the special high grade and 1.35 c. per lb. for the ordinary high grade.

Statistics for June show that zinc production and shipments continued to decline, production from 79,216 s.tons to 76,723 s.tons; shipments from 54,790 s.tons to 50,690 s.tons, whilst stocks rose from 165,038 s.tons to 187,676 s.tons. In the O.E.E.C. countries production of zinc during May totalled 79,306 tonnes as compared with 78,541 tonnes in April and stocks rose to 54,512 tonnes at the end of May as compared with 50,580 tonnes at the end of April. The O.E.E.C. countries produced 61,060 tonnes of lead in May compared with 61,760 tonnes in April and stocks rose to 69,299 tonnes at the end of May as compared with 67,016 tonnes at the end of April.

The first ten days of the new quota period of lead and zinc into the United States showed that for lead ore the Canadian quota has already been filled whilst those for Australia and South Africa have almost been completed. The quotas for other countries for both lead metal and zinc ore were also filled but it is interesting to note that only a very small tonnage of zinc metal was apparently waiting in warehouse to be imported at the beginning of the quota period.

In spite of the low rate of demand in the U.S., it is felt that the sterling zinc price is unlikely to recede to any extent as demand remains good and there will almost certainly be some interruption of supplies of the metal from the Congo. The lead market, however, is overshadowed by the probability that producers will not wish to continue the 10 per cent restriction in availability and that this will be removed for the last quarter of this year and should this prove to be correct, the price may well shed up to £5 per ton; if at the same time as removing the restriction attempts are made to sell the metal which is already being held back under the present agreement, it is possible that a complete collapse of the market may take place.

Closing prices are as follows:

	July 7		July 14	
	Buyers	*Sellers*	*Buyers*	*Sellers*
COPPER				
Cash	£255	£255½	£257½	£258
Three months ..	£244½	£244½	£249½	£250
Settlement ..	£255½		£258	
Week's turnover	6,800 tons		11,225 tons	
LEAD				
Current ½ month	£71½	£71½	£70½	£70½
Three months ..	£72½	£72½	£71½	£71½
Week's turnover	5,450 tons		7,475 tons	
TIN				
Cash	£809½	£810½	£809	£810
Three months ..	£801	£801	£805	£806
Settlement ..	£810		£810	
Week's turnover	1,055 tons		980 tons	
ZINC				
Current ½ month	£90½	£90½	£90	£90½
Three months ..	£89½	£89½	£90	£90½
Week's turnover	3,150 tons		6,750 tons	

Mining Finance

London Tin's Investments Up

With 77 per cent of its portfolio still in tin shares it had been expected that London Tin Corporation's profits would have started a recovery in the year to March 31 last and that still better things would be in store for 1960-61. The annual report bears this out. There is always something of a time lag between increased prosperity by the tin producers and its reflection in the accounts of the holding company. Dividends received by London Tin in its past financial period would have only just begun to mirror the higher earnings brought about by an increased metal price and rising outputs under the International Tin Agreement. The really major advances in distributions are only beginning to be made now.

The corporation has thus done quite well to lift its profit from £888,079 to £1,110,443 and its consolidated net profit after tax from £489,979 to £619,151. The 5 per cent higher dividend of 25 per cent on the 4s. shares had already been announced. It absorbs £554,042, leaving a £65,109 addition to the ample carry-forward, now £768,304. The balance sheet reflects the major rise in tin shares that started last summer, quoted investments of £5,257,265 having a market value of £14,746,544 on March 31 last, 67 per cent more than a year previously. It is likely, despite the spasm of weakness that has lately developed in the tin share market, that some further appreciation will have taken place since. Meanwhile, on the basis of the March 31 figures, net current assets work out at just on £15,000,000 equal to 16s. 6d. a share on the £3,618,236 capital. Present price of London Tin is 12s. 6d. to yield 8 per cent.

In his statement accompanying the report the chairman, Mr. J. Ivan Spens, says that "some further improvement" may reasonably be expected in London Tin's income for the current financial year. It looks, in fact, as though it could be quite an understatement providing no unexpectedly adverse developments occur in the industry. One of the long-term bull points for tin producers with good lives based on present ore in sight is that world supplies of tin are dwindling. It is notable in this respect that Mr. Spens says the Group's prospecting during the past year in Malaya has been disappointing.

MORE HIGHER TIN DIVIDENDS

Further encouraging dividends from tin producers have been announced by Malayan Tin, Southern Malayan and Tronoh, all in the 73, Cheapside group. Malayan and Southern Malayan have declared third interims of 7½d. per 5s. share on account of the year to June 30, making in each case a total of 1s. 3d. for that year to date with a fourth interim and a final still to come. There is now no doubt in the market's mind that the official forecast that Malayan would repeat last year's total of 1s. 6d. on the capital as doubled by the share bonus issue is going to be well surpassed. A minimum of 2s. 6d. is looked for. On a 2s. 6d. basis the shares at 25s. 9d. would yield 9.8 per cent.

The market is also raising its sights a little for Southern Malayan. It is thought that this company may perhaps likewise reach a total distribution of 2s. 6d. There is consequently a theory that they could be the cheaper of the two at 20s. to yield a possible 12.7 per cent.

Tronoh, which, incidentally, has shareholdings in both Malayan and Southern Malayan, is a calendar year company and the fifth interim now announced of 1s. 3d. per 5s. share is a balance payment for 1959. It makes a total of 3s. 1½d. against 2s. 2d. for 1958. There should be a first interim soon for 1960 and there is naturally a general expectation that Tronoh will pay more for the current year. In the meantime, the present yield at 41s. cum dividend is 7.7 per cent. As recently announced, the company has made a bid for Southern Tronoh.

BILLITON'S YEAR

The annual report of the Billiton Tin Co. of The Hague, states that the company attained considerably higher profits in 1959 than in 1958, as a result of improved economic conditions in the many branches of industry in which the company has an interest, according to the annual report. The gross consolidated total income rose from 9,400,000 to 11,200,000 guilders while the net profit increased from 3,200,000 to 5,100,000 guilders. For 1960 the company also expects favourable results. An unchanged 15 per cent dividend is proposed with an additional five per cent jubilee payment on the occasion of the company's centenary next September.

Since mining operations have stopped in Indonesia following agreement with the Indonesian Government, the company has embarked on new prospects, but the results of the Kamativi tin mines, in Southern Rhodesia, in which the Billiton Company invested 6,000,000 guilders, have not been up to expectations.

Bauxite sales of the Surinam subsidiary were higher than in 1958 and totalled 716,000 tons. An even higher output is expected for 1960 with favourable marketing possibilities. It is expected that the annual output will gradually rise to 1,250,000 tons in the next few years.

In co-operation with the Dutch Albatros Sulphuric Acid Works, Billiton is now constructing a titanium pigment plant near Rotterdam, which will have an initial capacity of 10,000 tons and which will be put into operation early in 1962. Glidden International USA will act as technical advisers.

Recently, Billiton acquired a 47 per cent interest in H. L. Enthoven.

NEW FUNDS FOR SAAIPLAAS

Almost exactly a year ago the headlines in the mining finance columns announced that Free State Saaiplaas, the new Gold Fields group mine in the south-eastern part of the Orange Free State field to the north of Harmony, was going to borrow £3,500,000. The money was needed to finance the company to production in July, 1960, at a monthly milling rate of 50,000 tons. Since then, however, things have not gone too well underground. Reef development has been limited in amount, payability low. So, initial milling is now having to be postponed until next October. At the same time another £3,000,000 is being raised to "maintain operations". This money is also to be spent on raising the production target to 100,000 tons monthly. This and the phrase "in order to make the best use of the payable tonnage resources" seem to indicate that Gold Fields are becoming resigned to the mine's being, anyway in its early stages, a lower-grade producer than was at one time thought.

It is realised, of course, that what with the uncertain political situation in South Africa and the price of Saaiplaas 10s. shares being little better than par, there is little likelihood of the public being over-keen to provide the fresh money. Consequently, Gold Fields has formed a syndicate to take up 6,000,000 Saaiplaas at par. Shareholders and noteholders may participate in up to half this amount if they wish. One of the poorest things in the Saaiplaas outlook is that the company is already saddling itself with a substantial equity capital as well as loans, although it is not yet clear whether the present money-raising is completely in addition to last year's £3,500,000 by way of loans. Full particulars are promised by the company shortly.

The 1959 loan syndicate consisted of Gold Fields, Anglo American Corporation, Anglo-Transvaal, Securities Agency and West Wits. Saaiplaas still has around £1,200,000 of 6½ per cent Notes outstanding which are convertible into shares at 15s. until June 30 of next year.

NCHANGA'S BUMPER RESULTS

The virtually trebled profits from Nchanga, the Northern Rhodesian copper mine in the Rhodesian Anglo American group, so far outstripped the experience of the Rhodesian Selection group mines based on the latter's quarterly reports that it would probably be wise to defer extended comment until next month's full report. Suffice to say now that in the year to last March Nchanga raised its profits before tax from £7,834,535 to £21,423,764, its net surplus from £4,704,535 to £13,643,764 and its dividend, with a final of 5s. 6d. net of Rhodesian tax per £1 unit, from an equivalent 3s. 1½d. to 7s. There are appropriations of £4,000,000 against only £729,450. The dividend takes £9,800,000. The profit on this occasion has been reached without making the usual charge for depreciation which required £1,289,934 a year ago.

These brilliant results are well worth bearing in mind even if they have not had any great market effect owing to the turbulence in the Congo. They are of importance to both Rhokana and Rhodesian Anglo American. Rhokana holds 33 per cent of Nchanga's capital, "Rhoanglo" 21 per cent.

BREMANG'S PROFITS RISING

At the Bremang Gold Dredging meeting the chairman, Mr. C. J. Burns, added to his statement in the annual report. He said that for the first six months of the current financial year working profits had increased by £33,000 to £164,719 and yardage dredged

from 3,932,500 to 5,085,100. Given, therefore, Mr. Burns continued, "a continuance of similar dredging results the profits for the current year should substantiate the confidence I have already expressed and in any case warrant the interim dividend of 10 per cent already declared."

The company's activities in Ghana continued harmoniously and relations with the government there and with the Mineworkers' Union remained excellent. At a time when the continent of Africa was the focal point of world attention "we should not lose sight of the favours we have already received and the spirit of co-operation existing between the mining industry as a whole and the Ghana Government."

BRITISH TIN INCREASES INTERIM

Following on the encouraging London Tin annual report already commented upon, British Tin Investment, the other major tin share holding company, has increased its interim for 1960 from 6 to 7 per cent on the 10s. shares. Last year the final was 16 per cent.

It will be surprising indeed if there is not an advance in the 1960 final. Before the news was known late on Wednesday evening the shares were quoted at 30s. 3d.

Idris Hydraulic Tin has also added to the growing list of higher payments from tin producers by declaring an interim of 4½d. per 2s. share for 1960. This compares with a first interim of 1½d. for 1959 which was followed by a final of like amount. Last year there was also a special cash distribution of 1½d. per 1s. share paid on a capital of £24,000 against the current £96,000. Idris stand at 11s. 9d.

LONDON MARKET HIGHLIGHTS

Mining markets have shown an unusual face in the last few days — unusual, that is, for 1960. Tin shares, star of the mining sections for many weeks, have suffered a spasm of weakness while Kaffirs and Rhodesian Coppers have looked quite firm.

The reason for the relapse in the Tin market was easy to determine. Much of the buying business in recent weeks has emanated from the east and it has been the eastern favourites that have shown the best improvements. This buying now seems to have dried up, and this has stimulated some profit-takers into realizing investments.

The result, of course, has been a fall in share prices. Perhaps more important, however, is the change in the market atmosphere. The boom is over; and some of the erstwhile favourites look vulnerable.

Tins are not a popular market, and though the present levels are probably fully justified by 1960-1961 earnings, the withdrawal of eastern support may be the prelude to a period of erratic movements with a downward trend. It must be remembered, however, that just as there was no obvious reason for the east's withdrawal, there need be no obvious reason for a re-entry which, of course, would change the picture.

The reason for the firmness in Copper shares, too, was clear. Initially the market continued weak under the influence of the Congo situation. Typically, Nchanga, standing at 60s. before its good results were announced, rose almost 4s. on their publication, only to fall back to 59s. 9d. on the following day.

On Monday, however, the first notes of optimism began to be heard. Dealers who had marked Rhodesians lower on the confused reports from the Congo were surprised to find a firm investment demand developing, and most shares closed near their best. On the following day demand was even more marked and was augmented by dealers undoing options for the call. Among the rises were 3s. for Nchanga, 2s. 3d. for Rhokana and 1s. 3d. for Bancroft. The reasoning was that should Union Minière be forced to close there would be a strong improvement in the copper price.

The course of Kaffirs, however, was difficult to account for. The period began with a continuation of the downward drift. Business was almost non-existent. But when Johannesburg re-opened on Tuesday buyers appeared, possibly on account of a further easing of the South African emergency regulations. Anticipation of good quarterly reports may also have helped some shares.

With the firmness continuing into Wednesday some useful gains were seen on the week. Free State Geduld finished at 117s. 6d., 2s. 6d. higher, the Saints were 1s. 3d. better at 65s., and Western Holdings finished 2s. 6d. up at 116s. 3d. Similar rises were seen in Western Deeps (39s. 3d.) and in Finance shares like Central Mining which closed at 68s., 1s. 9d. higher.

Other mining shares moved narrowly. Ashanti (18s. 10½d.) showed some firmness in front of next week's interim after having touched a new low for 1960 of 18s. 9d.

Personal

Mr. Omer C. Voss, who recently returned to the U.S. after a period of six years as managing director of International Harvester in Great Britain, has been appointed president of International Harvester in Canada. In announcing this appointment, the Board of Directors paid tribute to the notable success achieved by International Harvester in Great Britain under the direction of Mr. Voss.

*

Mr. T. Wintrup, sales manager (engineering) of Distington Engineering Co. Ltd., a subsidiary of the United Steel Companies Ltd., has been appointed purchasing and contracts manager. He will be responsible to the commercial manager for the purchasing activities of the company and for the placing of all sub-contracted work. Mr. J. Tonks, senior draughtsman, succeeds Mr. Wintrup as sales manager (engineering).

*

Associated Electrical Industries, Heavy Plant Division announce the following appointments: Mr. R. R. Huitson has been appointed consultant to the division and will undertake special duties in connection with the promotion of AEI business in centrifugal compressors and allied apparatus; Mr T. E. Adams, previously chief engineer, Nuclear Auxiliaries Department, is appointed manager of the Compressor Engineering Department.

Company News

The French subsidiary of Aluminium Ltd., Société Aluminium de France, has decided to change its name to Alcan Aluminium de France.

*

Ferodo Ltd. have announced their intention of building a new factory in Caernarvonshire in order to expand their production facilities for friction materials generally. On June 27, the South London branch of Ferodo moved from its premises in Clapham High St. to a new building at 114/116 Thornton Road, Thornton Heath, Surrey (Telephone: Thornton Heath 2224). The new premises have been specifically designed as a Ferodo depot.

*

Perkins Engines report that nearly 30,000 Perkins diesel engines have been sold to Germany in the last seven years.

*

The U.K. Atomic Energy Authority has signed collaboration and licence agreements with W. J. Fraser & Co., and Nuclear Chemical Plant, to compete for export business in the design and manufacture of radioactive chemical-processing plant.

*

The Congolese company previously known as Comité National du Kivu, is in future to be known as "Société Belgo-Africaine du Kivu" (SOBAKI).

Coming Events

The University of Arizona College of Mines is to hold a symposium on Surface Mining Practices on October 17 and 18. Tentative programme subjects include open pit mining, strip mining, quarrying, transportation, drilling and blasting, etc. Additional information may be obtained from professor H. G. Krumlauf at the College.

*

The 1960 conference of the Purchasing Officers Association will be held in Scarborough from September 29 to October 1.

*

The Institution of Mining and Metallurgy has announced that its general meetings for the session 1960-61 will be held at the Geological Society of London, at 5 p.m., on the following dates: October 20, November 17, December 15, January 19, 1961, February 16, March 16, April 20, and May 25, which will be the annual general meeting.

*

The Coal Show for 1961 of the American Mining Congress will be held in Cleveland, Ohio, May 15-18, 1961.

*

The 1960 Mining Show of the American Mining Congress will be held in Las Vegas from October 10-13.

LONDON TIN CORPORATION

CHAIRMAN'S STATEMENT

The Thirty-fourth Annual General Meeting of London Tin Corporation Limited will be held on August 4, at The Chartered Insurance Institute, 20 Aldermanbury, London, E.C.

The following is the statement by **Mr. J. Ivan Spens, O.B.E.,** the chairman, which has been circulated with the report and accounts for the year ended March 31, 1960.

We welcome Sir Douglas Waring, C.B.E., who has retired from Malaya and will now actively take up his duties as Deputy Chairman of this Corporation. He is succeded as Chairman of Anglo-Oriental (Malaya) Limited by Mr. D. R. Mitchell who has been a Director and Executive of that Company for many years.

Accounts

The Corporation's net profit for the year ended March 31, 1960, after providing for taxation, was £598,943 compared with £464,079 for the previous year.

The dividends totalling 25 per cent, less income tax at 7s. 9d. in the £, already paid in respect of the year (compared with 20 per cent, less income tax at 8s. 6d. in the £, last year) took £554,042 and left a balance of £44,901 to be added to the carry forward which now stands at £403,095.

The increase in our income from investments this year stems mainly from the greater quantity of tin permitted for export by the International Tin Council and from the higher price of tin which benefited the tin mining companies. Consequently dividends received from our large portfolio of tin mining investments were higher than appeared likely when I addressed you last year.

International Tin Control

The tin export quotas from the signatory countries permitted by the International Tin Council for the year under review were equivalent to about 75 per cent of their total production in the year prior to control. The comparable figure last year was 57 per cent.

A new International Tin Agreement, to take effect when the present Agreement expires on June 30, 1961, was approved at a United Nations Conference on Tin held in New York May 23, 1960—June 24, 1960. Subject to ratification, the new Agreement will be effective for five years from July 1, 1961. The operational mechanism will be similar to that in the present Agreement and the main objectives remain unchanged: to prevent excessive fluctuations in the price of tin and to ensure adequate supplies of the metal at prices fair to consumers and giving a reasonable return to producers.

Price of Tin

The London cash price of tin metal during the year ranged between £799 per ton and £778 per ton and the average was approximately £790 per ton compared with £745 per ton in the previous year.

Malaya

At the end of the year there were thirty-two dredges under the management of Anglo-Oriental (Malaya) Limited and ten of them were idle as the result of export control. In addition one dredge was in course of transfer to a new area; another was closed down for major repairs; and a third, which was originally closed down for security reasons, remained idle. There were thus only nineteen dredges in operation.

The output of tin concentrate from the mines under the management of Anglo-Oriental (Malaya) Limited was 10,074 tons against 11,207 tons permitted for export. The balance of 1,133 tons was exported from permitted mine stocks.

There was a further noteworthy improvement in the security situation during the year and the Malayan Government has announced that the State of Emergency which was declared in June, 1948, will end on July 31, 1960.

With the improvement in the security situation prospecting is being actively undertaken, although the programme is to some extent frustrated by delays in official dealings with applications. Results from the prospecting which Anglo-Oriental (Malaya) Limited has been able to do during the year have proved disappointing.

Thailand

The output of tin concentrate from the mines under the management of Anglo-Oriental (Malaya) Limited was 1,190 tons against permitted exports of 1,187 tons. At the end of the year one dredge was idle because of export control. The reconstruction of a 15-cubic ft. sea-going bucket dredge was completed and during the last quarter of the year it started production in tin-bearing areas off the coast of Bhuket Island, Thailand.

Nigeria

Nigeria will emerge as an independent member of the Commonwealth on October 1, 1960. We welcome this development and we look forward with confidence to a continuance of successful mining operations under the new Constitution which may be assured of the support and co-operation of the tin mining industry.

The mines under the management of A. O. Nigeria Limited produced 3,101 tons of tin concentrate against permitted exports of 3,503 tons. The balance of 402 tons was exported from permitted mine stocks.

Plans for the progressive increase of output were effected and, by the end of the year, a number of plants had been recommissioned.

The output of columbite was 417 tons and consumer interest in this product increased considerably in the last half of the year.

General

The present rate of tin export quotas is higher than that for the year under review and the price of tin continues satisfactory. If these factors are maintained during the current year it may be expected that some of the idle dredges and other plants will be restarted and, if there are no adverse developments in other directions, we may reasonably expect some further improvement in our income for the year to March 31, 1961.

We extend to the Staff of all nationalities in our Management Organizations in Malaya, Thailand and Nigeria, as well as in London, our appreciation of their loyal and active service during the year.

BREMANG GOLD DREDGING

The twenty-third annual general meeting of Bremang Gold Dredging Co., Ltd., was held on July 11 in London.

Mr. C. J. Burns, Chairman, presided and the following is an extract from his Statement circulated with the Report and Accounts for the year ended December 31, 1959:—

The confidence expressed in my Review last year has been evidenced by the results of the year now under review, leading to a substantial increase in profits.

By reason of appropriations totalling £226,226 your Board consider that a prudent liquid policy should be adopted at this stage, at the same time recognizing the reward due to members. A dividend of 15% less Income Tax is therefore recommended.

It is important for Members to appreciate that the Accounts for the year to December 31, 1960, will not be burdened by Dredge Transfer Expenditure and four dredges will be in operation throughout the entire year. The financial strength of your Company can be truly seen when the total cost of all four dredge removals, in excess of one and a half million pounds, is set against the Debenture loans at present outstanding, £250,000, and the relatively small Capital of £521,685.

Having passed through a period of heavy capital expenditure and, although taxation charges will gradually increase, nevertheless given similar profit conditions for the future the prospects for Members will be most attractive. It is for this reason that your Board have decided to pay an interim dividend of 10%, less tax, in respect of the year to December 31, 1960.

Because of the move to the Offin River, No. 3 Dredge worked only for 7½ months of the year. Total yardage dredged for the year was 9,351,500 against 9,778,300 for 1958, a decrease of only 426,800 yards, and gold produced, 62,373 ounces was 6,619 ounces better than the previous year.

The net profit for the year, £222,111, as against £154,036 for 1958, indicates the improved conditions which can be expected to continue through 1960.

The Company's relations with the Ghana Government have always been excellent. Ghana is most anxious to develop to the full its economic resources. The help and assistance of United Kingdom companies in this expansion is sincerely sought and appreciated.

The report and accounts were adopted.

Metal and Mineral Trades

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Board.

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